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Patent Office
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I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003906308 for a patent by NGA SOFTWARE CORPORATION PTY LTD as filed on 17 November 2003.

I further certify that the name of the applicant has been amended to HARBOUR TRIUMPH LTD pursuant to the provisions of Section 104 of the Patents Act 1990.

WITNESS my hand this
Twenty-third day of August 2004

J. Billingsley

JULIE BILLINGSLEY
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P/00/009 25.5.91
Regulation 3.2

AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

Invention Title: VARIABLE MOMENTUM ALTERTING SYSTEM

The invention is described in the following statement:

Variable Momentum Alerting System

This invention is related to a method and apparatus for determining and communicating changes in a variable. It is particularly related to changes in price of shares, futures or options on a stock exchange such as the Australian Stock Exchange (ASX) and using a telephone network such as Telstra™ (in Australia) to communicate the change by SMS or email, but is not limited to such use. The method and apparatus would apply to any application which involves a dynamic or changing data stream; i.e. any values changing from, say, a value of "a" to "b". The methodology is not restricted by the actual frequency of change but, at a minimum, at least one data change; i.e. a to b. As an example of the treatment of low frequency data change, the methodology would apply to the infrequent changing of a data stream, such as airline flight details where a booked flight is "a" but then at some time after the booking, the flight is changed to "b". This is an example of an application to low frequency dynamic data streams.

It is known in the share context that there are price based alert systems which operate by the end-user inputting their particular stock code and price alert level (ASX code and price) either via a website or, in very few cases, a mobile telephone handset. The system then identifies price matches between the ASX live price of a stock and the input stock alert price. Once a match is identified, a Short Message Service (SMS) alert or email is generated from the system. A new data input process is then required every time an alert is triggered, making it very user unfriendly and labour intensive.

The most commonly available commercial alert systems come from Iguana 2™ (SMS Quotes) and Stock Alerts™. There are other alert systems, all operating with the same price based format but used specifically for a group's own clients i.e. Commsec™, Westpac™.

One of the problems with these systems is that they are all price based. Therefore, after an alert has been triggered, it is washed from the system and a new data input is required. As a consequence, these price based systems are very labour intensive and

require ongoing manual input from the end-user. Ultimately, the end-users tire of this ongoing data input process which becomes logistically more difficult the more stocks or variables that are being monitored.

Additionally, most of the systems require available access to either a payment gateway or a remote website to register or pay. Some require both. SMS Quotes™ utilises the Telstra™ WAP portal but, initially, the end-user must visit a remote website and pay a monthly fee for the service before it can be accessed and used.

Still further, all the price based alert systems are really only suitable for well experienced internet end-users who can navigate through the set up and payment process. Price based applications are not suitable for Telco models that need to be as simple to use, set up and access as, for example, the Telstra™ 101™ free answering service that operates throughout Australia. That service requires only three pushes of a key pad and it is set up ready for use.

The major problem with all price based alert systems is that they require far too much ongoing surveillance and input by the user. This makes them user unfriendly and the reason why they are not used ongoing by many clients. All price based systems require entry of two data components – stock code and stock price.

It is therefore an object of the invention to provide a variable momentum alerting system which overcomes or at least ameliorates the problems of the prior art and, in particular, a price momentum alerting system.

In accordance with the invention there is provided variable momentum alerting system including the steps of:

receiving from a user an identification of required variable data input;

obtaining the current live value (LDS) of the identified required data input and determining it as the reference input (RI);

calculating one or more reference variable levels (RVLs) using the captured reference input (RI);

searching dynamic live data values of the identified required data and comparing with the reference variable levels (RVLs);
communicating to the user when the current live value of the identified required data matches with any of the reference variable levels (RVLs).

Hence, when LDS = RVL, an alert message is generated. In a preferred embodiment of the invention, the system will compare the LDS with the RI in addition to the RVLs and the RVLs will be calculated as predetermined variations from the captured RI. In a particularly preferred embodiment, the predetermined variations will be determined by reference to a Fibonacci series of numbers. The identification of the required variable data input by the user may be by a digital telephone (WAP and SMS gateway), internet, intranet or general network.

It can therefore be seen that the system shows the change over time by communicating different price matches. Therefore if the variable continues to increase there will have been communicated a first match with a first reference variable level which could for example be 5% higher and then a second reference variable level which is for example 10% higher than the reference input. Therefore the momentum of the variable is communicated and not just the match with a predefined number. This momentum can also be communicated in time display format such as graphically or be received and computed by the receiver of the user into a time display format such as graphically based on signals of matches to the reference input (RI) or one or more of the reference variable levels (RVLs).

The invention also provides the outer reference variable level points to be defined as reset points such that when the current live value of the identified required data matches with one of the outer reference variable levels (RVLs) apart from communicating the match, the RI is then reset and new reference variable levels (RVLs) are determined. This reset of the Reference Input can be to the previously matched outer RVL. In addition, the reset can be executed manually by the user at any time without waiting for a match with any outer reference variable level (RVL).

The invention also may provide a function that permits the user to reset or reprogram the RVLs. This can be executed either from a mobile/PDA handset or a website at any time for a variable, such as for all portfolio stocks or for individual stocks.

It is important to note that the RI is not the critical data element used in the alert loop. The RI is used to calculate the reference variable levels (RVLs). It is the RVLs that are price matched with the dynamic data stream (LDS) and trigger the reset of the RI once outer RVLs have been matched. Similarly, it is the interaction of the RVLs that generate the alerts and enables the system to operate automatically and ongoing with minimal data input other than that of entering/deleting stock codes for monitoring.

Also in accordance with one form of the invention there is provided a price momentum alerting system which comprises stock code data input via mobile handset or website. After an ASX code is logged, a Proprietary Trading Combination (PTC) Reader captures the live ASX price for the logged ASX code (Reference Price), time and date stamps the entry and reconciles customer account details in a Telco network. The PTC Reader instantly calculates the Price Momentum Levels (PMLs) using the captured Reference Price (RP) of each logged ASX code. The system searches for price matches between ASX live feed and PMLs, (and not on a specific alert price entered by the user). The RP determines the PMLs. The RP is automatically amended as the price of a stock moves out of the PML alert range so as to keep it current or it can be changed by the end-user at any time manually.

In order that the invention is more readily understood an embodiment will be described by way of illustration only with reference to the figures wherein:

Figure 1 is a block diagram of a variable momentum alerting system in accordance with one embodiment of the invention;

Figure 2 is an example of suitable preset trading levels in relation to a reference price;

Figure 3 is a further example of the preset trading levels in relation to the reference price;

Figure 4 provides an organisational flow chart of the technology; and

Figure 5 shows a graphical representation of what a mobile handset would look like.

Referring to the drawings there is shown an example of an SMS mobile telephone alert. In the process of the price momentum alerting system of the invention there is included the steps of:

i. stock code data input via mobile handset (WAP and SMS gateway) or website

ii. After ASX code is logged, the Reader captures the live ASX price for the logged code (Reference Price), time and date stamps entry and reconciles customer account details in Telco network.

iii. PTC Reader instantly calculates the Price Momentum Levels (PMLs) using captured Reference Price (RP).

iv. PTC Reader instantly searches for price matches between ASX live feed and PMLs, (and not on any specific price entered by the user)

v. The RP determines the PMLs. The RP is automatically amended as the price of a stock moves out of the PML alert range so as to keep it current or it can be changed by the end-user at any time manually;

vi. The fact that a PML has been price matched with a dynamic data price is communicated by an SMS/email to the end-user.

The SMS alert could read:

"Stock Alert! Stock code TLS in your portfolio has risen and triggered a key trading (LL1) level. Call your adviser on 0 to discuss.
End of Safeshare alert message".

Each message contains the contact details of the customer adviser linked to an automatic call back function. If an enduser does not have a client adviser, a default number will be included to permit the enduser to establish new adviser account details.

Once an alert for a stock code has been triggered, no further inputting of data is required for that stock code. An alert can only occur once in succession. This is

made possible because an alert can only be repeated after another alert level has been triggered.

i.e. SL1, SL2, SL1, SL2, SL3, SL2, etc; but never SL1, SL1, SL2, SL1, SL1, etc.

This specific alert sequencing addresses multi generation of the same alert in a row repeatedly. This function is called Alternate Alert Generation (AAG). Therefore, the AAG function means that triggered alert levels, unlike in price based systems, do not require re entering alert data by the end-user since an alert can only be generated twice or more if a different alert level has been triggered first.

Price Momentum Alerting System of the invention is a clever and novel way of automating the whole stock alert process. It is a WAP based application that utilises the programming of preset trading levels (called PMLs) that are calculated from a reference price captured the moment an end-user keys in an ASX code via a mobile handset or website. Price Momentum Alerting System requires the entry of only a stock code i.e. three pushes of a mobile handset/computer keyboard key representing three letters only.

The reference price is time and date stamped and is critical in calculating a series of split price trigger levels on both the upside and downside (PMLs).

1. END USER KEYS IN A THREE LETTER CODE INTO A MOBILE HANDSET OR WEBSITE
i.e. TLS THROUGH WAP NETWORK
↓ ASX DATA FEED

2. INFORMATION REQUEST SENT TO A WAP LINKED DATABASE THAT INTERFACES WITH THE ASX LIVE DATA FEED. THE ASX PRICE FOR THE INPUTED CODE IS TIME AND DATE STAMPED. THIS PRICE IS CALLED THE REFERENCE PRICE AND IS USED TO CALCULATE ALL THE KEY TREND POINTS

CALLED PRICE MOMENTUM LEVELS (PML).

↓

3. SL1= -5% SL2= -10% SL3= -15% SL4= -20%

LL1= +10% LL2=+20% LL3= +30% LL4= 50%

THESE PML POINTS ARE THEN USED TO IDENTIFY PRICE MATCHES WITH THE ASX LIVE DATA FEED

↓

SMS ALERT OR EMAIL IS GENERATED WHEN ASX PRICE = PML i.e. LL1 etc.

ONCE A PRICE MATCH IS IDENTIFIED, AN ALERT IS GENERATED AND SENT TO A MOBILE (SMS Alert) OR TO A PDA/PC (email)

When an enduser logs in an ASX stock code into their mobile handset or website to be monitored, at the moment of login, the entry is time and date stamped and the price of the stock is captured. This price is called the reference price. This price is NOT used in the alert loop as in other alert systems that are price based. Instead, the reference price is used to calculate a series of price levels both up and down. These levels are called Price Momentum Levels (PMLs) and it is these key swing or trend levels that enable stocks to be monitored automatically with minimum manual in put or update.

This is further illustrated in Figures 2 and 3. The PML price levels can be changed by altering the reference price.

Changing Reference Price (RP) – this is done automatically for the average person or end-user. For example, stock A is logged in at $1. The PMLs are instantly calculated from the RP i.e. SL1= 0.95, SL2=0.90, SL3= 0.85, SL4= 0.80;

LL1=1.10, LL2=1.20, LL3=1.30, LL4=1.50.

When the stock moves beyond each extreme level in the PML range i.e. either on the downside, SL4 or on the upside, LL4, the Reference Point is automatically reset at one of these points. i.e. at SL4 if stock has moved down, LL4 if it has moved up. In the example above, if the stock price rose to $1.85 (no alerts would be generated because the price had moved beyond the PML alert levels), the reference price would be automatically reset at $1.85. The instant this happens, a new set of PMLs are calculated based on the new reference price i.e. SL1= 1.75 etc.

Manual changing of the Reference Price (RP) – For professional traders who need to be able to monitor stocks that they wish to buy and trade, a function enabling them to manually change a stocks reference point and reset the PMLs from either their mobile handset or the website is available.

The psuedocode to guide a software programmer in the collation of a suitable program to perform the invention is as follows:

Overview

SafeShare monitoring consists of a database containing information about a subscriber such as their mobile phone number, email address, advisors phone number and personal message text they would like to receive via SMS or email.
Subscribers select stocks that they wish to have monitored on their behalf.
A PTCReader application monitors a master list of stocks for price variations and alerts the relevant subscribers with an SMS and/or email custom alert should a stock pass a key alert level.

User Interfaces

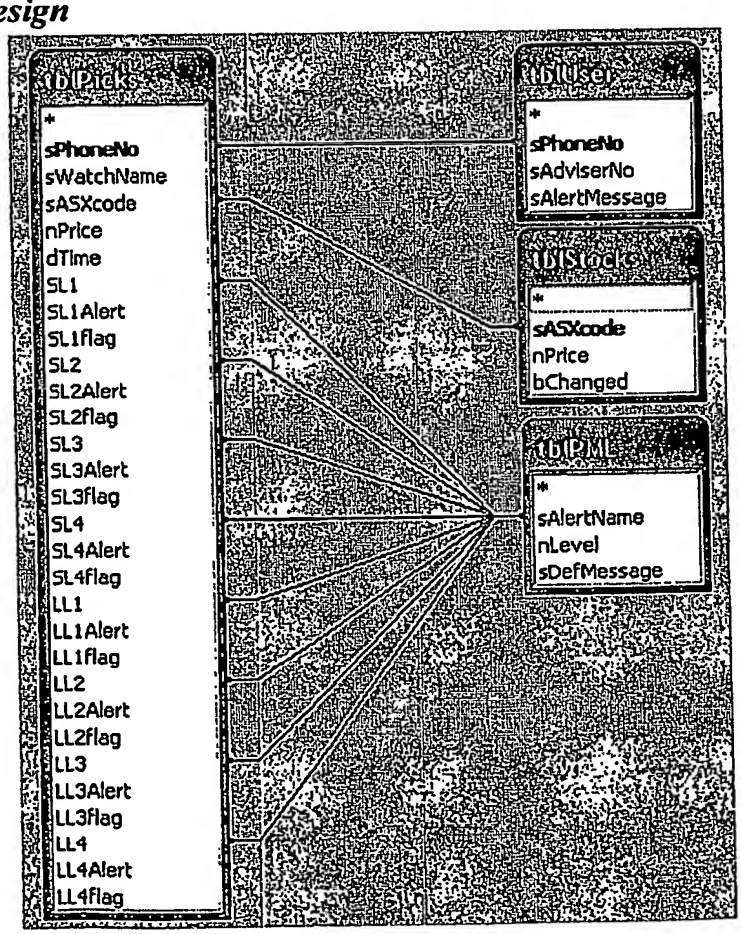
The user may register, add/delete and enter preferences via a website and/or a WAP mobile browser. The mobile phone WAP interface uses the same database as the website so the user may switch between using their phone and an internet browser to administer their SafeShare account.

In the most basic circumstance, the user would browse on their phone to the SafeShare WAP site and enter one or more 3 letter share codes and this would be all that is required for them to commence receiving price movement alerts.

Additionally the user could then choose their alert preference such as email, SMS, both or temporarily suspend all alerts.

Database

Design



tblUser

Users mobile phone number is primary key for this table and stores other associated User information such as Advisor's phone number and the format of the message they wish to receive.

tblPicks

Stores snapshot price of a nominated ASX code together with calculated PML levels and Alert Messages.

If an alert is sent out then it is flagged to eliminate another alert of the same level getting sent unless another level alert is reached in the meantime.

This table will not be completely normalized so as to optimize speed when the PTC Reader scans this table for alert candidates.

tblPML

Defines each alert (PML) level and the default alert message that corresponds to this level.

When a User defines a stock they will get the default alert message assigned to their selection initially however they may be able to customise this message themselves (in a later version).

tblStocks

As each new stock code is added by any user it is also added to this master table of stocks under watch by the PTC Reader.

This table will grow and shrink dynamically as stocks are added and deleted to peoples watch lists.

To maximise performance only these stocks will be analysed via the live ASX feed eliminating redundant updating of stock prices from the ASX when no watch lists require this data.

A flag is stored to indicate if a price remains unchanged since the last update. Should this be the case then the PTC Reader need not account for this code in its next analysis.

PTCReader

An application daemon that monitors the stocks table for any price movements. When a price movement is detected the application searches for details of the user who has that stock on their watch list and constructs the relevant alert and sends it.

pseudocode

```
Select all stocks that have a price change since last cycle
With each changed stock..
    Select all users who have this stock in their watch list
    With each user
        Determine if price change for stock crosses a key indicator level
        Construct and send appropriate alert
    Next user
Next stock
Next cycle
```

Alert messages

translations

The message will have embedded key words that will be dynamically translated at runtime such as.

<adviser_no> Advisor's telephone number.

<asx_code>	ASX code this alert relates to.
<watch_name>	Watch name this stock is assigned under.
<alert_level>	The key trading level alert.

For example the alert for SL1 could be:

SafeShare Alert !

"Stock code <asx_code> in your <watch_name> portfolio has fallen and triggered a key trading (<alert_level>) level. Pls call your adviser on <advisor_no> to discuss action".

End of ShareSafe message alert

SafeShare Alert !
"Stock code TLS in your CORE portfolio has fallen and triggered a key trading (SL1) level
Pls call your adviser on 0409090780 to discuss action".
End of ShareSafe message alert

Technology & Tools

Current prototype.

Minimum System Requirements

- Operating System Win32 (Windows)
- IIS – Internet Information Server – to host ASP/WAP application
- SQL Server

Recommended System Requirements

- Windows 2000 Server with IIS
- SQL 2000

It should be understood that the above description is by illustration only and is not limiting on the invention. Clearly persons skilled in the art would understand variations to the above without any inventive input and such variations are included within the scope of this invention.

NGA Software Corporation Pty Ltd
By their Patent Attorneys
PIPERS
Dated: 17 Nov. 03

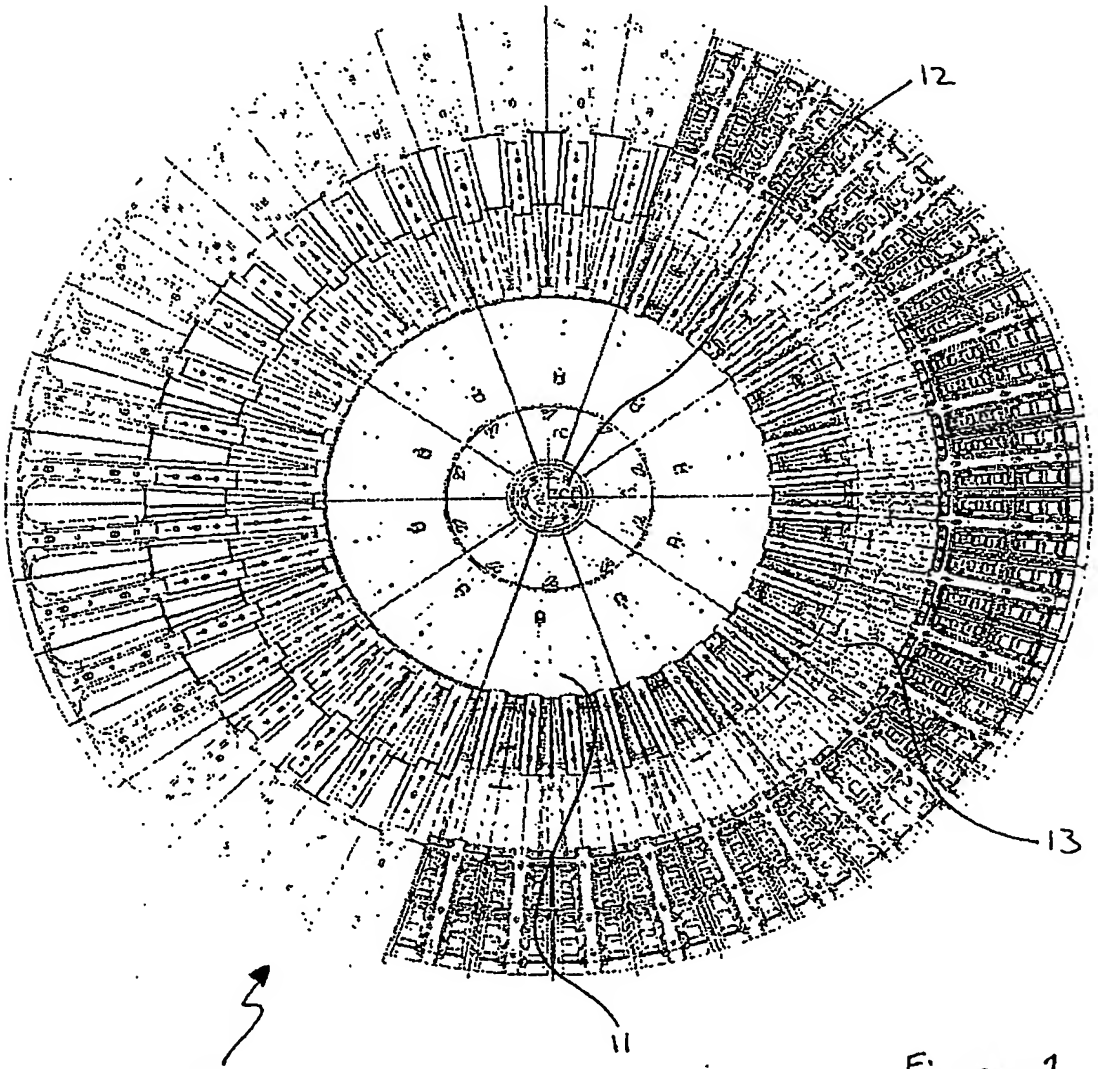


Figure 1

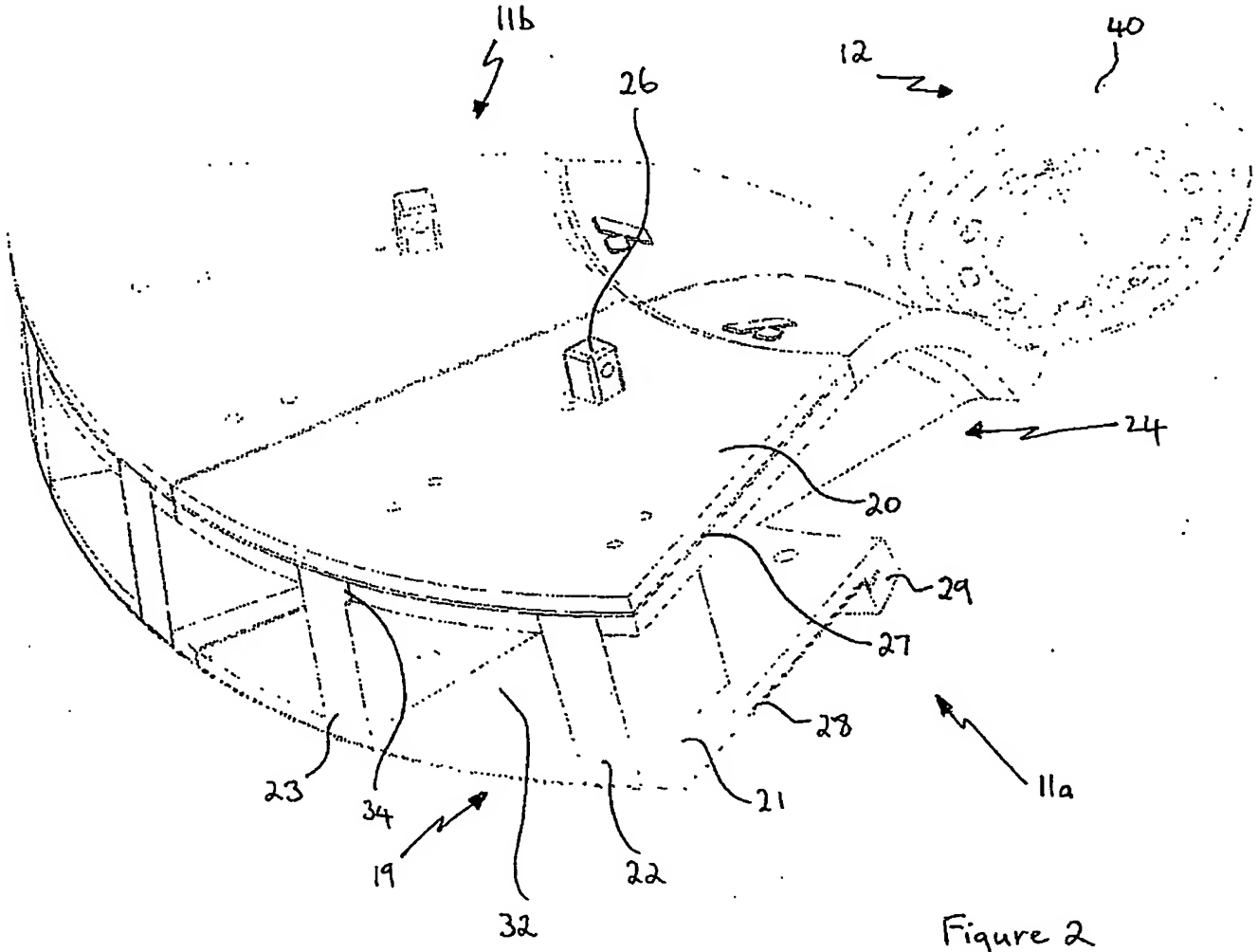


Figure 2

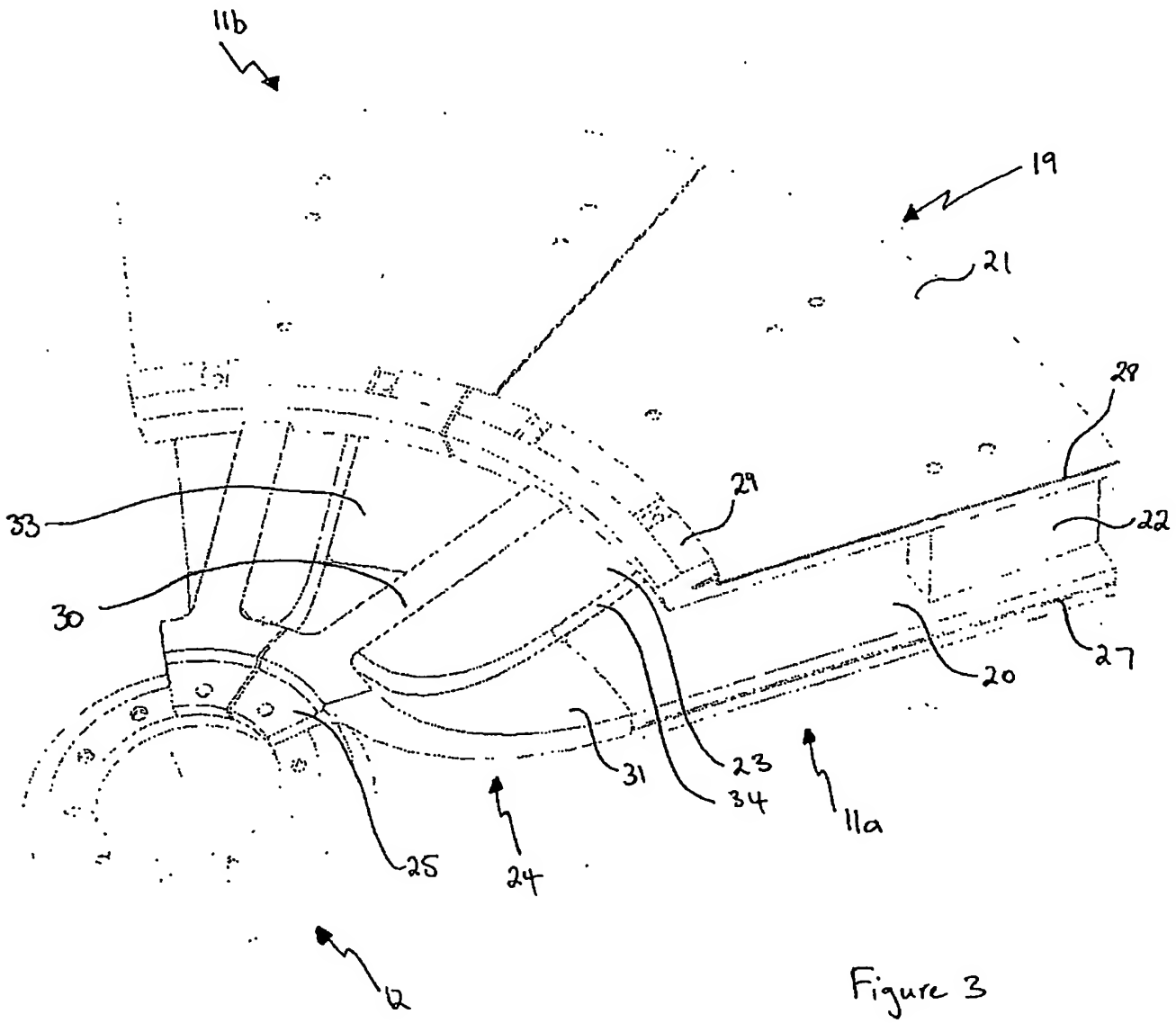


Figure 3

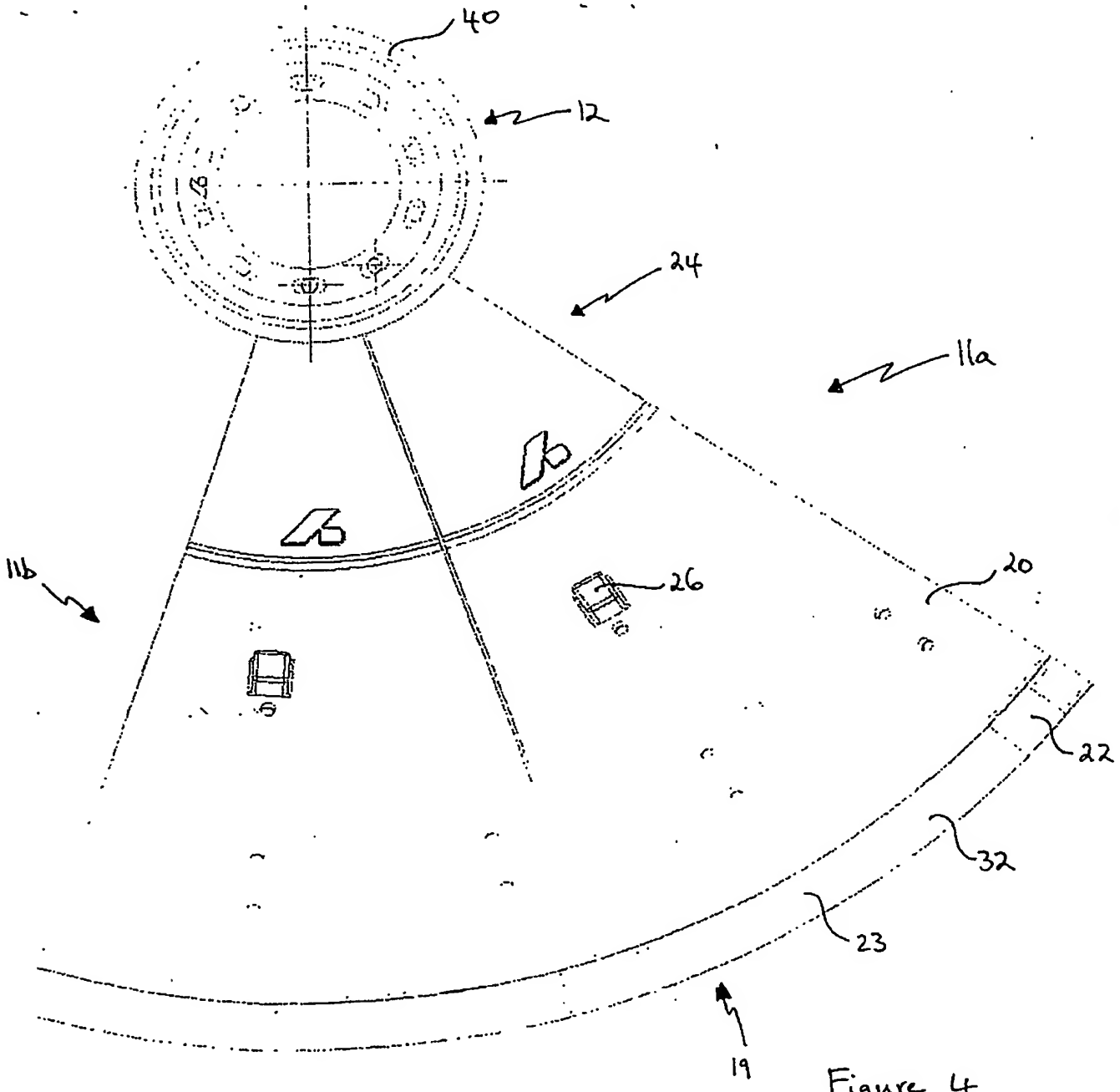


Figure 4

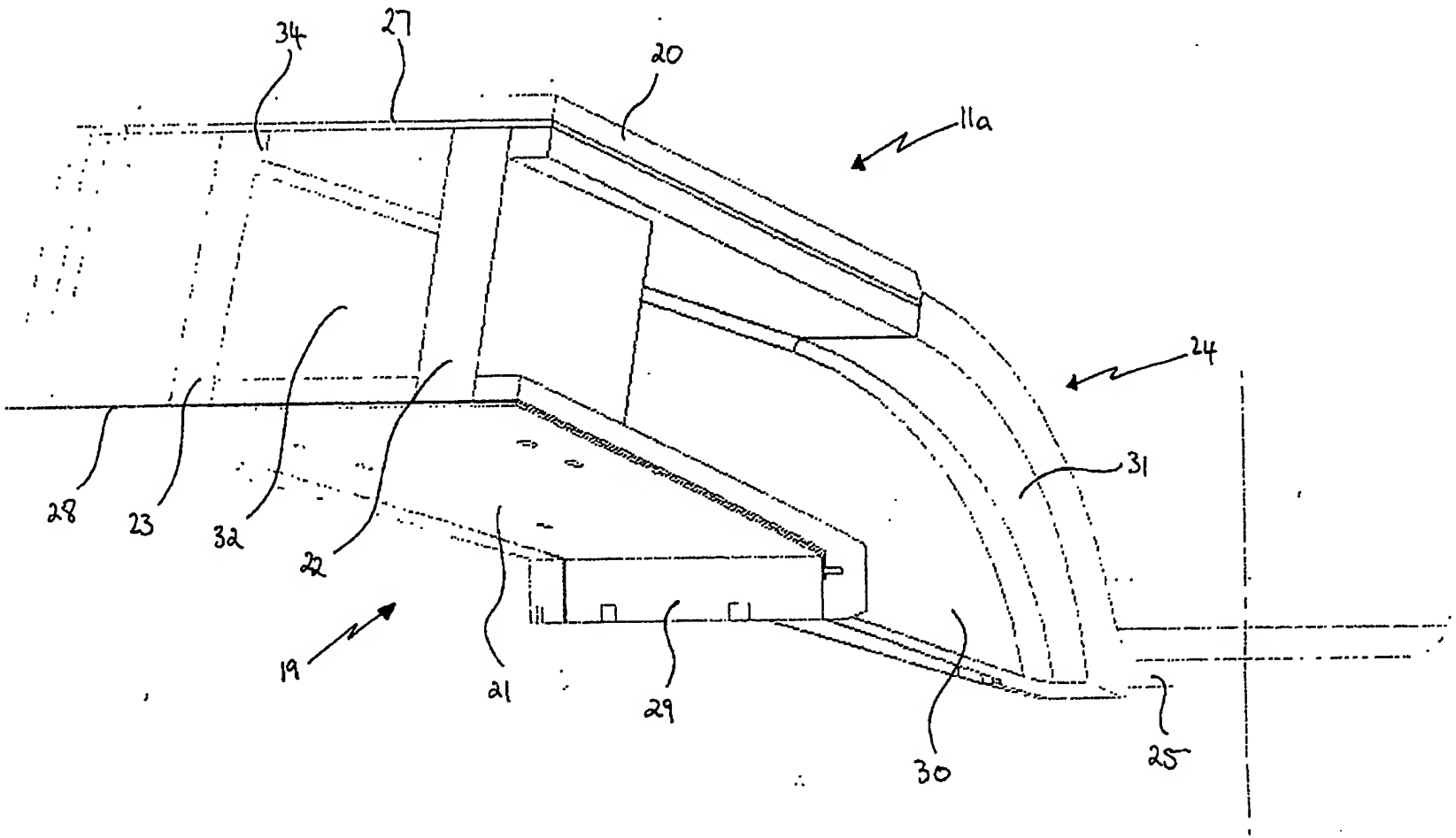


Figure 5

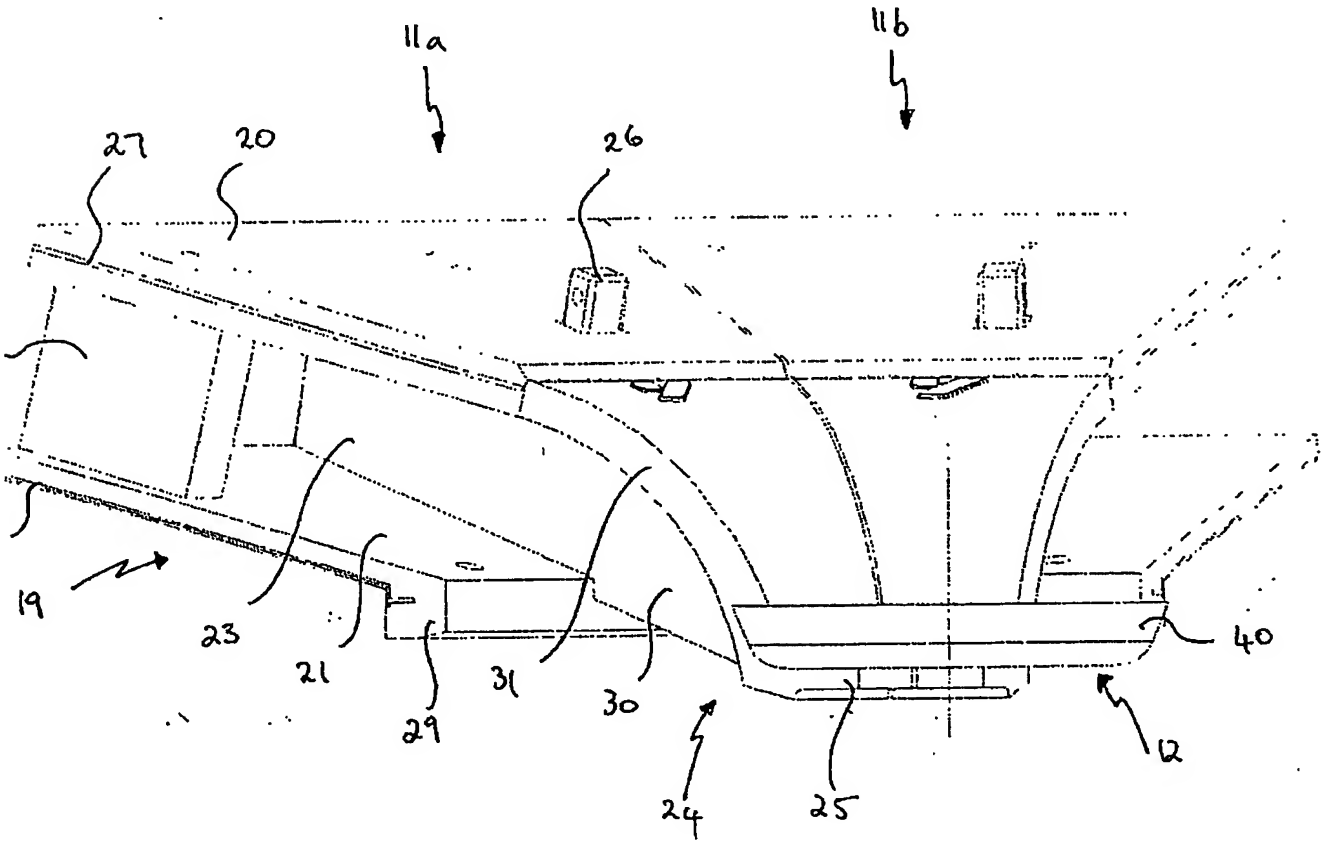


Figure 6

AUSTRALIA

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PROVISIONAL SPECIFICATION

Applicant:

BRADKEN RESOURCES PTY LIMITED

A.C.N. 098 300 988

Invention Title:

DISCHARGE CONE FOR GRINDING MILLS

The invention is described in the following statement:

Scope of the Invention

The present invention relates to discharge cones for grinding mills.

Background to the Invention

Operation of a grinding mill typically involves feeding material and water into one end of the mill and discharging the ground product at the other end of the mill. The product is typically discharged through a discharge cone which forms part of a discharge end wall of the grinding mill. The discharge cone typically comprises a number of discharge cone elements arranged around the central axis of the mill.

Each discharge cone element typically comprises a body portion and a nose cone. The body portion typically comprises top and bottom plates separated by one or more upright members. The nose cone projects from the body portion towards the centre of the discharge end wall and includes a central vane and a flange, extending from either side of the vane, and formed integrally with the top plate.

The discharge cone elements may be constructed entirely of steel. A problem with all-steel discharge cone elements is that they are extremely heavy, which may reduce the amount of material which can be loaded into the grinding mill and thus reduce the throughput of the mill. Furthermore, because the steel discharge cone elements are heavy, they can be difficult to maneuver during installation and/or removal from the mill.

In response to the above problem, discharge cone elements have been constructed from a composite of materials. Upright member(s) have been constructed from steel or rubber coated mild steel plate and the remaining components, in particular the top and bottom plates and the nose cone, have been constructed substantially of rubber.

Although such composite material discharge cone

elements are lighter than all-steel discharge cone elements, they suffer from another problem. Portions of the rubber components have been found to wear out reasonably quickly thus necessitating the entire discharge cone element to be replaced on a more frequent basis. Replacement of the discharge cone elements is extremely costly in forms of both the cost of replacement element and downtime of the grinding mill.

Summary of the Invention

According to a first aspect of the present invention there is provided a discharge cone for a grinding mill, the discharge cone comprising a plurality of discharge members, each discharge member being formed from a composite of materials and comprising a body portion and a nose cone, the body portion comprising a top plate and a bottom plate separated by at least one upright member disposed between the top and bottom plates, the nose cone being cast from metal and projecting from the body portion towards the centre of the discharge cone.

Preferably, the nose cone comprises a central vane and a downwardly curving flange extending from either side of the vane.

Preferably, the flange is arranged to form a substantially continuous surface with a bottom surface of the top plate.

Preferably, the central vane is integrally formed with one of the at least one uprights.

Preferably, one or more of the at least one uprights includes a metal rib extending along the side of the upright(s) corresponding to the direction in which the grinding mill, in use rotates, the metal rib arranged, in use to form a continuous surface with the bottom surface of the top plate.

Preferably, the top and bottom plates each comprise a metal reinforcing sheet disposed between layers of rubber.

Preferably, each of the discharge members further comprises a lifting boss, located on the axis perpendicular to the top and bottom plates, the axis passing through the centre of mass of the discharge member, the lifting boss adapted for use in manoeuvring the discharge member for installation and/or removal from the grinding mill.

Preferably, the lifting boss is integrally formed with one of the at least one uprights and projects through the top plate.

Alternatively, each of the discharge members further comprises a pair of lifting lugs, located on the top surface of the top plate and positioned either side of the axis which passes through the centre of mass of the discharge member.

Preferably, the nose cone further comprises a clamping tongue at the end of the nose cone which projects towards the centre of the discharge cone, the clamping tongue adapted, in use, to allow the discharge member to be fixed in position in the grinding mill.

Preferably, the clamping tongue is adapted, in use, to connect each discharge member to a clamping ring.

Preferably, the at least one upright is constructed of white iron steel. The at least one upright may have a non-constant radial cross-section.

Preferably, the nose cone is constructed of white iron steel.

According to a second aspect of the present invention there is provided a discharge member for a grinding mill as defined in the first aspect of the present invention.

Brief Description of the Drawings

Preferred embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a plan view of the discharge end wall

of a grinding mill from inside the mill;

Fig. 2 is a perspective rear view of two discharge cone members connected to a clamping ring;

Fig. 3 is a perspective view from below of the discharge cone members of Fig. 2;

Fig. 4 is a top view of the discharge cone members of Fig. 2;

Fig. 5 is a perspective view from the side and below of the discharge cone members of Fig. 2, with one of the discharge cone members partially cut away; and

Fig. 6 is a perspective front view of the discharge cone members of Fig. 2.

Detailed Description of the Drawings

Referring firstly to Fig. 1, a grinding mill has a discharge end wall 10, including inner and outer sections. The inner section is a discharge cone which is made up of a number of discharge cone members 11 each attached to a clamping ring 12 located towards the centre of the discharge end wall 10. The discharge end wall 10 of the grinding mill illustrated in Fig. 1 has ten discharge cone members 11. However, this number may vary according to the type of grinding mill. The outer section of the discharge end wall 10 comprises a plurality of cavity channels 13, which surround the discharge cone members 11. In use, material in the grinding mill passes through a screening wall (not shown) before entering the cavity channels 13 at the rim of the discharge end wall 10. As the grinding mill rotates, the material under gravitational and centrifugal force, passes through the cavity channels 13 into the discharge cone members 11 and exits the grinding mill through the centre of the discharge end wall 10.

Referring now to Figs. 2 to 6, each discharge cone member 11 has a body portion 19 and a nose cone 24 projecting away from the body portion 19 towards the clamping ring 12, which in use is located at the centre of

the discharge end wall 10. In the embodiment shown in Figs. 2 to 6, the nose cone 24 is integrally formed with part of the body portion 19. The entirety of nose cone 24 is cast from metal, for example steel, and the body portion 19 is constructed of a composite of materials, namely metal and rubber.

The body portion 19 has a top plate 20 and a bottom plate 21, spaced apart by a first upright 22 and a second upright 23. The discharge cone member 11 may have only one upright, or alternatively, may have two or more uprights. The top and bottom plates 20 and 21 are shaped as annular segments and are of approximately the same dimensions.

Each of top and bottom plates 20 and 21 are constructed of two layers of rubber separated by a metal reinforcing sheet 27 and 28 respectively. The metal reinforcing sheets 27 and 28 provide added strength and rigidity to the top and bottom plates 20 and 21 as well as facilitating connection of the top and bottom plates 20 and 21 to the first and second uprights 22 and 23 by a plurality of bolts. The metal reinforcing sheets 27 and 28 are constructed of, for example, mild steel plate.

The bottom plate 21 has a ridge 29 connected to the bottom surface at the inner end of the bottom plate 21. The ridge, in use, is adapted to sit on a frame at the discharge end of the grinding mill so as to support the discharge member 11 in use.

The first and second uprights 22 and 23 are substantially rectangular prisms in shape and are cast from metal, for example, white iron steel. The first and second uprights 22 and 23 are arranged, in use, so that their longest side is orientated radially with respect to the clamping ring 12. The second upright 23 extends along the radial length of the body portion 19. The first upright 22 extends from the outer end of the body portion 19 only partially along the radial length of the body portion 19.

In an alternative embodiment, the first and second uprights 22 and 23 have a non-constant radial cross-section, whereby the first and second uprights 22 and 23 have portions which are thinner and thicker depending on which regions of the first and second uprights 22 and 23, in use, are subjected to the most wear. By thinning out the regions of the uprights 22 and 23 which are not subjected to much wear, the weight of the discharge cone member 11 can be reduced. Furthermore, by thickening the regions of the uprights 22 and 23 which experience the most wear, the operational life of the discharge cone members 11 can be extended. The exact shaping of the first and second uprights 22 and 23 is dependent on the grinding mill in which the discharge cone member 11 is to be used.

The second upright 23 has a steel rib 34 extending along the side of the second upright 23 corresponding to the direction in which the grinding mill, in use, rotates. The steel rib 34 is located towards the top of the second upright 23 and has a substantially rectangular cross-section, so that the lower surface of the steel rib 34 forms a continuous surface with the bottom surface of the top plate 20. The purpose of the steel rib 34 will become apparent further on in the specification.

The nose cone 24 has a central vane 30 and a downwardly curving flange 31 extending from either side of the central vane. In use, the nose cone 24 is arranged so that the lower surface of downwardly curving flange 31 forms a substantially continuous surface with the bottom surface of the top plate 20. The central vane 30 is integrally formed with the second upright 23, such that the second upright 23 and the nose cone 24 are cast as a single piece.

Each discharge cone member 11 also has a clamping tongue 25 integrally formed at the inner end of the nose cone 24, i.e. remote from the body portion 19. The

clamping tongue 25 is adapted, in use, to connect each discharge cone member 11 to the clamping ring 12. The clamping ring 12 is an annular disc with a raised outer edge 40, the outer edge 40 being shaped to have a close fit with the top surface of the nose cone 24. This helps prevent the loss of fines from discharge end of the grinding mill, by deflecting the fines into a trunion (not shown). The clamping ring 12 is provided with apertures, evenly spaced around the disc. The clamping tongue 25 also has an aperture whereby, attachment of the discharge cone member 11 is achieved by aligning the aperture in the clamping tongue 25 with one of the apertures in the clamping ring 12 and passing a bolt therethrough. The clamping ring 12 is cast from a metal, for example steel.

In use, the material enters the body portion 19 of the discharge cone member 11 through a passageway 32 created between the top and bottom plates 20 and 21 and the first and second uprights 22 and 23. Material will also enter through a similar passageway created between the top and bottom plates 20 and 21 of two neighbouring discharge cone members 11a and 11b and the first upright 22 of one discharge cone member 11a and the second upright 23 of a neighbouring discharge cone member 11b.

The material then passes between the top and bottom plates 20 and 21 under gravitational and centrifugal force. The majority of the material moves along the side of the second upright 23 corresponding to the direction in which the grinding mill, in use, rotates. Because this results in a higher localised region of wear, the steel rib 34 is provided to reduce the wear to the rubber top plate 20.

Material exiting the grinding mill exits the discharge cone member 11 through exit 33, which is formed by the central vanes 30, the bottom plates 21 and opposing sides of the flanges 31 of two neighbouring discharge cone members 11a and 11b. A majority of the impact and wear caused by the material exiting the discharge cone members

11a and 11b occurs along the bottom surface of the flange 31 and the side walls of the central vane 30.

Each discharge cone member 11 also has a lifting boss 26, located on the axis perpendicular to the top and bottom plates 20, 21, the axis passing through the centre of mass of the discharge member 11. The axis also passes through the second upright 23, such that the lifting boss is integrally formed with the second upright 23 and projects through the top plate 20. The lifting boss 26 is therefore also cast from metal for example white iron steel. The lifting boss 26, is adapted, in use, to facilitate lifting and maneuvering of the discharge cone member 11 for installation into and/or removal from the grinding mill. Alternatively, each discharge cone member 11 may be provided with a pair of lifting lugs, positioned either side of the axis which passes through the centre of mass of the discharge member 11 such that the lifting lugs facilitate stable lifting and maneuvering of the discharge member 11.

For the purposes of this specification it will be clearly understood that the word "comprising" means "including but not limited to", and that the word "comprises" has a corresponding meaning.

Modifications and improvements may be incorporated without departing from the scope of the present invention.

Dated this 15th day of August 2003
BRADKEN RESOURCES PTY LTD
By its Patent Attorneys
GRIFFITH HACK
Fellows Institute of Patent and
Trade Mark Attorneys of Australia

tblUser

Users mobile phone number is primary key for this table and stores other associated User information such as Advisor's phone number and the format of the message they wish to receive.

tblPicks

Stores snapshot price of a nominated ASX code together with calculated PML levels and Alert Messages.

If an alert is sent out then it is flagged to eliminate another alert of the same level getting sent unless another level alert is reached in the meantime.

This table will not be completely normalized so as to optimize speed when the PTC Reader scans this table for alert candidates.

tblPML

Defines each alert (PML) level and the default alert message that corresponds to this level.

When a User defines a stock they will get the default alert message assigned to their selection initially however they may be able to customise this message themselves (in a later version).

tblStocks

As each new stock code is added by any user it is also added to this master table of stocks under watch by the PTC Reader.

This table will grow and shrink dynamically as stocks are added and deleted to peoples watch lists.

To maximise performance only these stocks will be analysed via the live ASX feed eliminating redundant updating of stock prices from the ASX when no watch lists require this data.

A flag is stored to indicate if a price remains unchanged since the last update. Should this be the case then the PTC Reader need not account for this code in its next analysis.

PTCReader

An application daemon that monitors the stocks table for any price movements. When a price movement is detected the application searches for details of the user who has that stock on their watch list and constructs the relevant alert and sends it.

pseudocode

Select all stocks that have a price change since last cycle
With each changed stock..
    Select all users who have this stock in their watch list
    With each user
        Determine if price change for stock crosses a key indicator level
        Construct and send appropriate alert
    Next user
Next stock
Next cycle

Alert messages

translations

The message will have embedded key words that will be dynamically translated at runtime such as.

<adviser_no> Advisor's telephone number.
<asx_code> ASX code this alert relates to.
<watch_name> Watch name this stock is assigned under.
<alert_level> The key trading level alert.

For example the alert for SL1 could be:

SafeShare Alert !
"Stock code <asx_code> in your <watch_name> portfolio has fallen and triggered a key trading (<alert_level>) level. Pls call your adviser on <advisor_no> to discuss action".

End of ShareSafe message alert

SafeShare Alert !
"Stock code TLS in your CORE portfolio has fallen and triggered a key trading (SL1) level
Pls call your adviser on 0409090780 to discuss action".
End of ShareSafe message alert

Technology & Tools

Current prototype.

Minimum System Requirements

- Operating System Win32 (Windows)
- IIS – Internet Information Server – to host ASP/WAP application
- SQL Server

Recommended System Requirements

- Windows 2000 Server with IIS
- SQL 2000

It should be understood that the above description is by illustration only and is not limiting on the invention. Clearly persons skilled in the art would understand variations to the above without any inventive input and such variations are included within the scope of this invention.

NGA Software Corporation Pty Ltd
By their Patent Attorneys
PIPERS
Dated: 17 Nov. 03

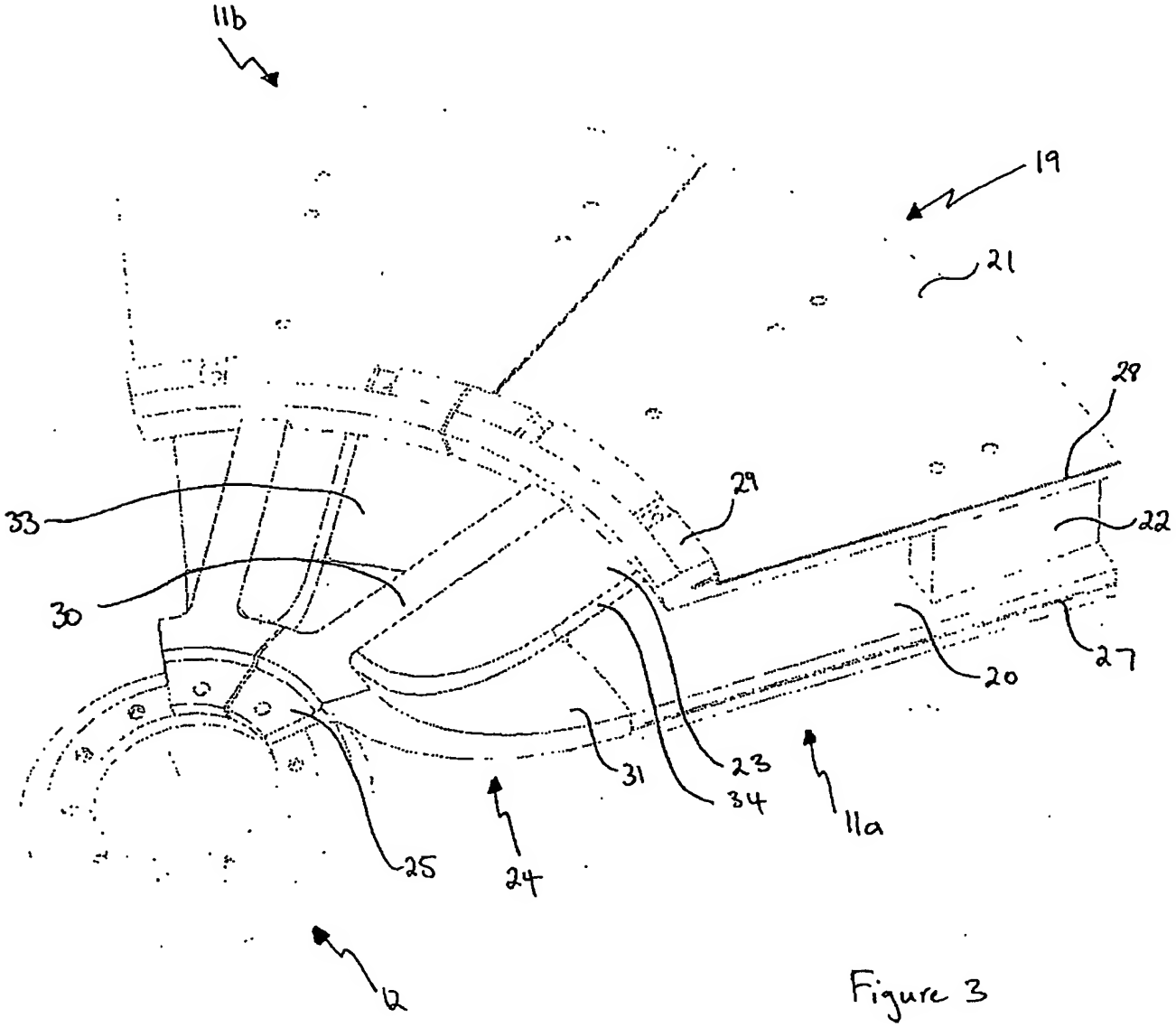

Figure 3

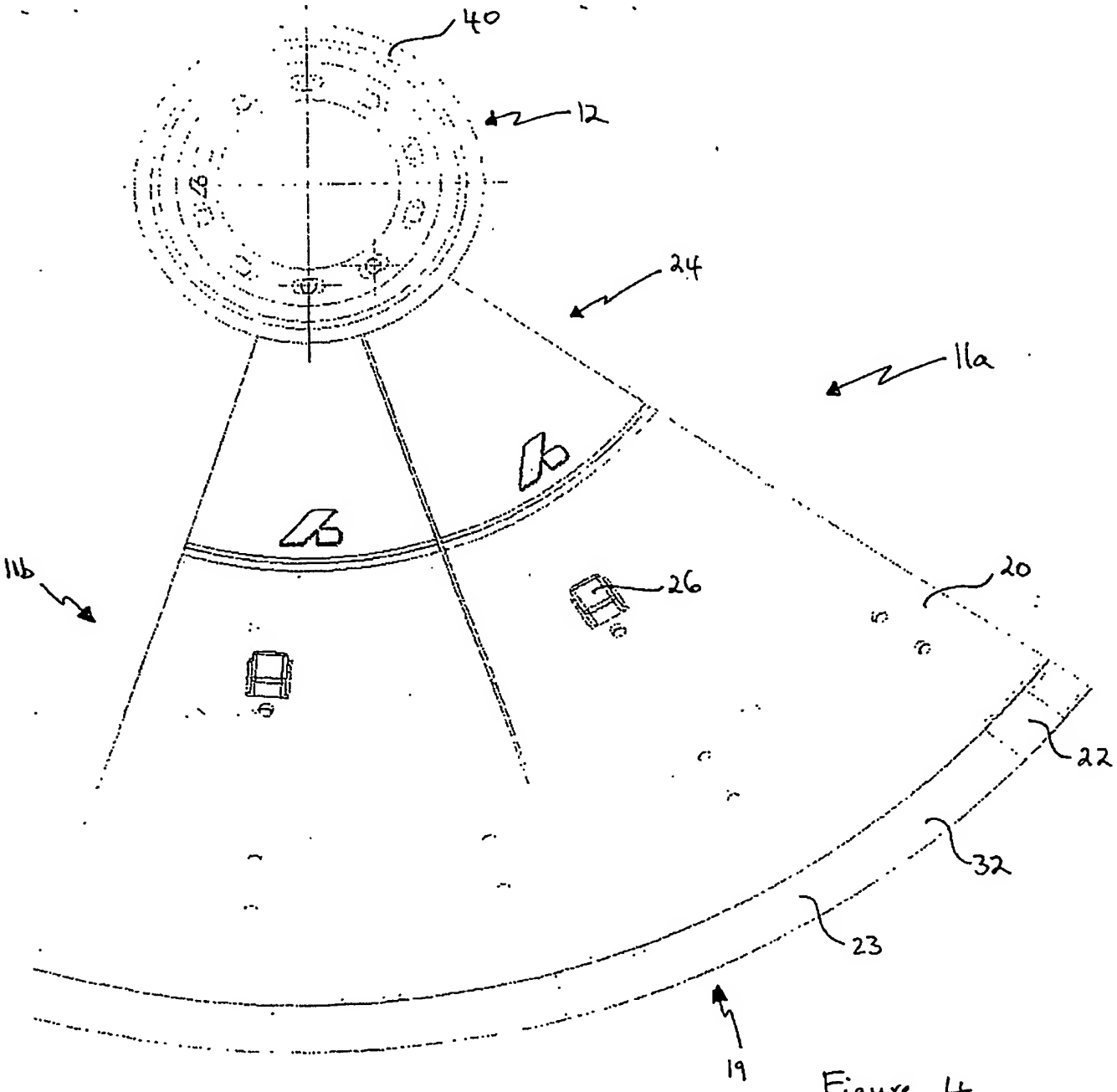

Figure 4

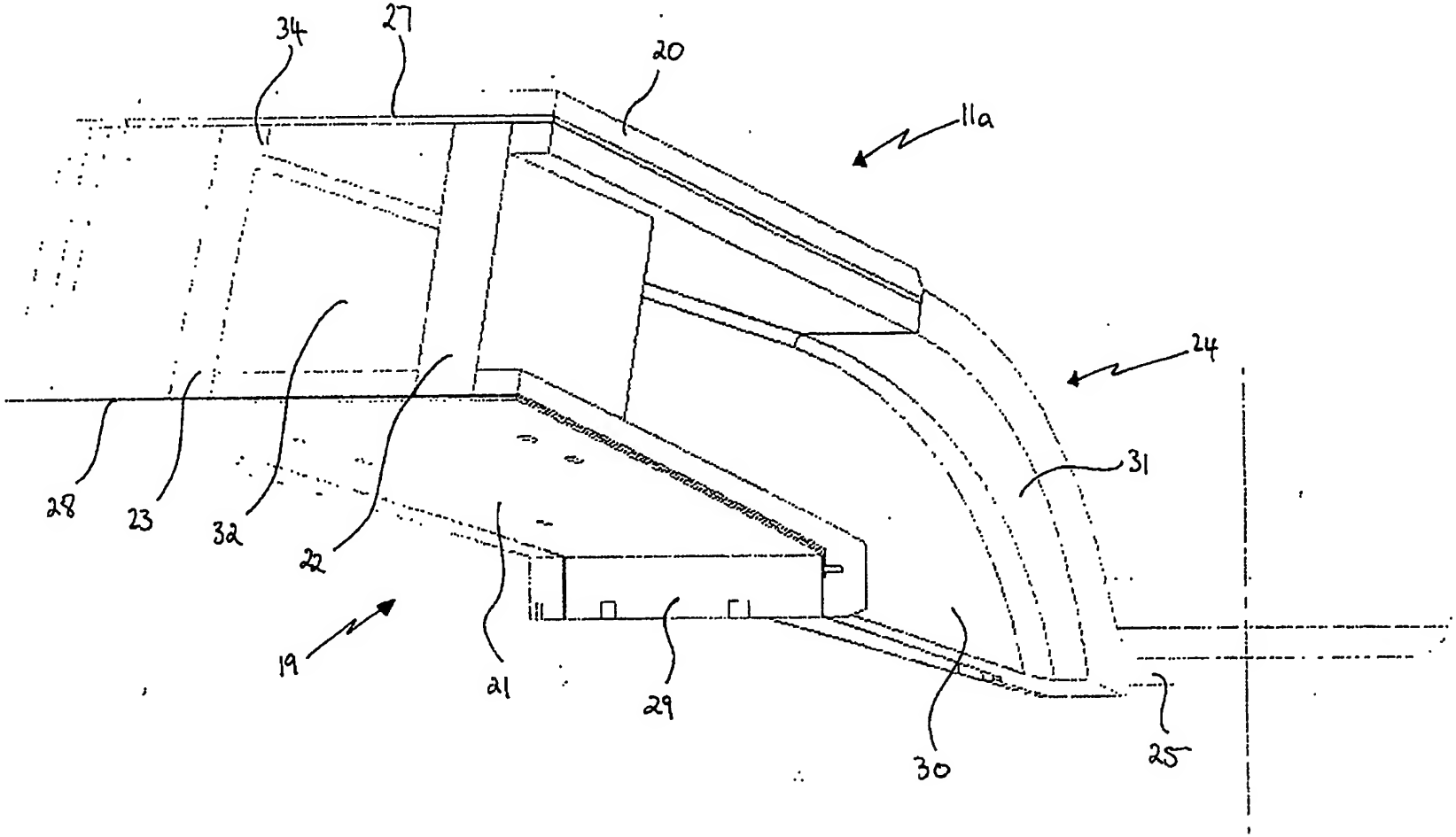

Figure 5

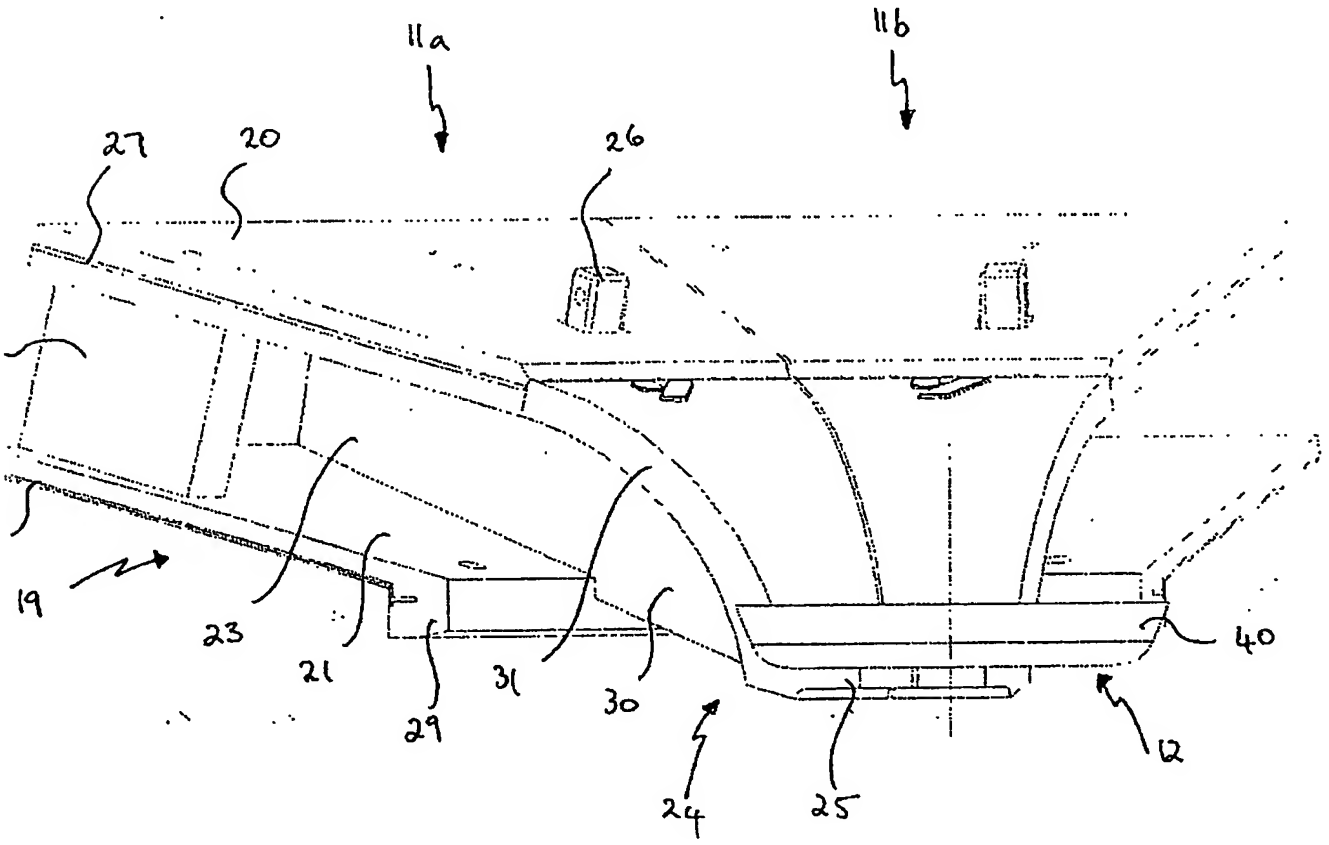

Figure 6

AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

Applicant:

BRADKEN RESOURCES PTY LIMITED

A.C.N. 098 300 988

Invention Title:

DISCHARGE CONE FOR GRINDING MILLS

The invention is described in the following statement:

Scope of the Invention

The present invention relates to discharge cones for grinding mills.

Background to the Invention

Operation of a grinding mill typically involves feeding material and water into one end of the mill and discharging the ground product at the other end of the mill. The product is typically discharged through a discharge cone which forms part of a discharge end wall of the grinding mill. The discharge cone typically comprises a number of discharge cone elements arranged around the central axis of the mill.

Each discharge cone element typically comprises a body portion and a nose cone. The body portion typically comprises top and bottom plates separated by one or more upright members. The nose cone projects from the body portion towards the centre of the discharge end wall and includes a central vane and a flange, extending from either side of the vane, and formed integrally with the top plate.

The discharge cone elements may be constructed entirely of steel. A problem with all-steel discharge cone elements is that they are extremely heavy, which may reduce the amount of material which can be loaded into the grinding mill and thus reduce the throughput of the mill. Furthermore, because the steel discharge cone elements are heavy, they can be difficult to maneuver during installation and/or removal from the mill.

In response to the above problem, discharge cone elements have been constructed from a composite of materials. Upright member(s) have been constructed from steel or rubber coated mild steel plate and the remaining components, in particular the top and bottom plates and the nose cone, have been constructed substantially of rubber.

Although such composite material discharge cone

elements are lighter than all-steel discharge cone elements, they suffer from another problem. Portions of the rubber components have been found to wear out reasonably quickly thus necessitating the entire discharge cone element to be replaced on a more frequent basis. Replacement of the discharge cone elements is extremely costly in forms of both the cost of replacement element and downtime of the grinding mill.

Summary of the Invention

According to a first aspect of the present invention there is provided a discharge cone for a grinding mill, the discharge cone comprising a plurality of discharge members, each discharge member being formed from a composite of materials and comprising a body portion and a nose cone, the body portion comprising a top plate and a bottom plate separated by at least one upright member disposed between the top and bottom plates, the nose cone being cast from metal and projecting from the body portion towards the centre of the discharge cone.

Preferably, the nose cone comprises a central vane and a downwardly curving flange extending from either side of the vane.

Preferably, the flange is arranged to form a substantially continuous surface with a bottom surface of the top plate.

Preferably, the central vane is integrally formed with one of the at least one uprights.

Preferably, one or more of the at least one uprights includes a metal rib extending along the side of the upright(s) corresponding to the direction in which the grinding mill, in use rotates, the metal rib arranged, in use to form a continuous surface with the bottom surface of the top plate.

Preferably, the top and bottom plates each comprise a metal reinforcing sheet disposed between layers of rubber.

Preferably, each of the discharge members further comprises a lifting boss, located on the axis perpendicular to the top and bottom plates, the axis passing through the centre of mass of the discharge member, the lifting boss adapted for use in manoeuvring the discharge member for installation and/or removal from the grinding mill.

Preferably, the lifting boss is integrally formed with one of the at least one uprights and projects through the top plate.

Alternatively, each of the discharge members further comprises a pair of lifting lugs, located on the top surface of the top plate and positioned either side of the axis which passes through the centre of mass of the discharge member.

Preferably, the nose cone further comprises a clamping tongue at the end of the nose cone which projects towards the centre of the discharge cone, the clamping tongue adapted, in use, to allow the discharge member to be fixed in position in the grinding mill.

Preferably, the clamping tongue is adapted, in use, to connect each discharge member to a clamping ring.

Preferably, the at least one upright is constructed of white iron steel. The at least one upright may have a non-constant radial cross-section.

Preferably, the nose cone is constructed of white iron steel.

According to a second aspect of the present invention there is provided a discharge member for a grinding mill as defined in the first aspect of the present invention.

Brief Description of the Drawings

Preferred embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a plan view of the discharge end wall

of a grinding mill from inside the mill;

Fig. 2 is a perspective rear view of two discharge cone members connected to a clamping ring;

Fig. 3 is a perspective view from below of the discharge cone members of Fig. 2;

Fig. 4 is a top view of the discharge cone members of Fig. 2;

Fig. 5 is a perspective view from the side and below of the discharge cone members of Fig. 2, with one of the discharge cone members partially cut away; and

Fig. 6 is a perspective front view of the discharge cone members of Fig. 2.

Detailed Description of the Drawings

Referring firstly to Fig. 1, a grinding mill has a discharge end wall 10, including inner and outer sections. The inner section is a discharge cone which is made up of a number of discharge cone members 11 each attached to a clamping ring 12 located towards the centre of the discharge end wall 10. The discharge end wall 10 of the grinding mill illustrated in Fig. 1 has ten discharge cone members 11. However, this number may vary according to the type of grinding mill. The outer section of the discharge end wall 10 comprises a plurality of cavity channels 13, which surround the discharge cone members 11. In use, material in the grinding mill passes through a screening wall (not shown) before entering the cavity channels 13 at the rim of the discharge end wall 10. As the grinding mill rotates, the material under gravitational and centrifugal force, passes through the cavity channels 13 into the discharge cone members 11 and exits the grinding mill through the centre of the discharge end wall 10.

Referring now to Figs. 2 to 6, each discharge cone member 11 has a body portion 19 and a nose cone 24 projecting away from the body portion 19 towards the clamping ring 12, which in use is located at the centre of

the discharge end wall 10. In the embodiment shown in Figs. 2 to 6, the nose cone 24 is integrally formed with part of the body portion 19. The entirety of nose cone 24 is cast from metal, for example steel, and the body portion 19 is constructed of a composite of materials, namely metal and rubber.

The body portion 19 has a top plate 20 and a bottom plate 21, spaced apart by a first upright 22 and a second upright 23. The discharge cone member 11 may have only one upright, or alternatively, may have two or more uprights. The top and bottom plates 20 and 21 are shaped as annular segments and are of approximately the same dimensions.

Each of top and bottom plates 20 and 21 are constructed of two layers of rubber separated by a metal reinforcing sheet 27 and 28 respectively. The metal reinforcing sheets 27 and 28 provide added strength and rigidity to the top and bottom plates 20 and 21 as well as facilitating connection of the top and bottom plates 20 and 21 to the first and second uprights 22 and 23 by a plurality of bolts. The metal reinforcing sheets 27 and 28 are constructed of, for example, mild steel plate.

The bottom plate 21 has a ridge 29 connected to the bottom surface at the inner end of the bottom plate 21. The ridge, in use, is adapted to sit on a frame at the discharge end of the grinding mill so as to support the discharge member 11 in use.

The first and second uprights 22 and 23 are substantially rectangular prisms in shape and are cast from metal, for example, white iron steel. The first and second uprights 22 and 23 are arranged, in use, so that their longest side is orientated radially with respect to the clamping ring 12. The second upright 23 extends along the radial length of the body portion 19. The first upright 22 extends from the outer end of the body portion 19 only partially along the radial length of the body portion 19.

In an alternative embodiment, the first and second uprights 22 and 23 have a non-constant radial cross-section, whereby the first and second uprights 22 and 23 have portions which are thinner and thicker depending on which regions of the first and second uprights 22 and 23, in use, are subjected to the most wear. By thinning out the regions of the uprights 22 and 23 which are not subjected to much wear, the weight of the discharge cone member 11 can be reduced. Furthermore, by thickening the regions of the uprights 22 and 23 which experience the most wear, the operational life of the discharge cone members 11 can be extended. The exact shaping of the first and second uprights 22 and 23 is dependent on the grinding mill in which the discharge cone member 11 is to be used.

The second upright 23 has a steel rib 34 extending along the side of the second upright 23 corresponding to the direction in which the grinding mill, in use, rotates. The steel rib 34 is located towards the top of the second upright 23 and has a substantially rectangular cross-section, so that the lower surface of the steel rib 34 forms a continuous surface with the bottom surface of the top plate 20. The purpose of the steel rib 34 will become apparent further on in the specification.

The nose cone 24 has a central vane 30 and a downwardly curving flange 31 extending from either side of the central vane. In use, the nose cone 24 is arranged so that the lower surface of downwardly curving flange 31 forms a substantially continuous surface with the bottom surface of the top plate 20. The central vane 30 is integrally formed with the second upright 23, such that the second upright 23 and the nose cone 24 are cast as a single piece.

Each discharge cone member 11 also has a clamping tongue 25 integrally formed at the inner end of the nose cone 24, i.e. remote from the body portion 19. The

clamping tongue 25 is adapted, in use, to connect each discharge cone member 11 to the clamping ring 12. The clamping ring 12 is an annular disc with a raised outer edge 40, the outer edge 40 being shaped to have a close fit with the top surface of the nose cone 24. This helps prevent the loss of fines from discharge end of the grinding mill, by deflecting the fines into a trunion (not shown). The clamping ring 12 is provided with apertures, evenly spaced around the disc. The clamping tongue 25 also has an aperture whereby, attachment of the discharge cone member 11 is achieved by aligning the aperture in the clamping tongue 25 with one of the apertures in the clamping ring 12 and passing a bolt therethrough. The clamping ring 12 is cast from a metal, for example steel.

In use, the material enters the body portion 19 of the discharge cone member 11 through a passageway 32 created between the top and bottom plates 20 and 21 and the first and second uprights 22 and 23. Material will also enter through a similar passageway created between the top and bottom plates 20 and 21 of two neighbouring discharge cone members 11a and 11b and the first upright 22 of one discharge cone member 11a and the second upright 23 of a neighbouring discharge cone member 11b.

The material then passes between the top and bottom plates 20 and 21 under gravitational and centrifugal force. The majority of the material moves along the side of the second upright 23 corresponding to the direction in which the grinding mill, in use, rotates. Because this results in a higher localised region of wear, the steel rib 34 is provided to reduce the wear to the rubber top plate 20.

Material exiting the grinding mill exits the discharge cone member 11 through exit 33, which is formed by the central vanes 30, the bottom plates 21 and opposing sides of the flanges 31 of two neighbouring discharge cone members 11a and 11b. A majority of the impact and wear caused by the material exiting the discharge cone members

11a and 11b occurs along the bottom surface of the flange 31 and the side walls of the central vane 30.

Each discharge cone member 11 also has a lifting boss 26, located on the axis perpendicular to the top and bottom plates 20, 21, the axis passing through the centre of mass of the discharge member 11. The axis also passes through the second upright 23, such that the lifting boss is integrally formed with the second upright 23 and projects through the top plate 20. The lifting boss 26 is therefore also cast from metal for example white iron steel. The lifting boss 26, is adapted, in use, to facilitate lifting and maneuvering of the discharge cone member 11 for installation into and/or removal from the grinding mill. Alternatively, each discharge cone member 11 may be provided with a pair of lifting lugs, positioned either side of the axis which passes through the centre of mass of the discharge member 11 such that the lifting lugs facilitate stable lifting and maneuvering of the discharge member 11.

For the purposes of this specification it will be clearly understood that the word "comprising" means "including but not limited to", and that the word "comprises" has a corresponding meaning.

Modifications and improvements may be incorporated without departing from the scope of the present invention.

Dated this 15th day of August 2003
BRADKEN RESOURCES PTY LTD
By its Patent Attorneys
GRIFFITH HACK
Fellows Institute of Patent and
Trade Mark Attorneys of Australia

Bright Field (optical)

A

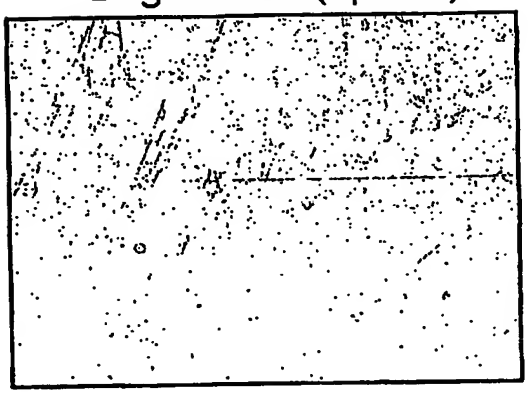

Fig 5A

Phase Map (calculated)

B

Fig 5B

Phase Image (optical)

C

Fig 5C

P/00/009 25.5.91
Regulation 3.2

AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

Invention Title: VARIABLE MOMENTUM ALTERTING SYSTEM

The invention is described in the following statement:

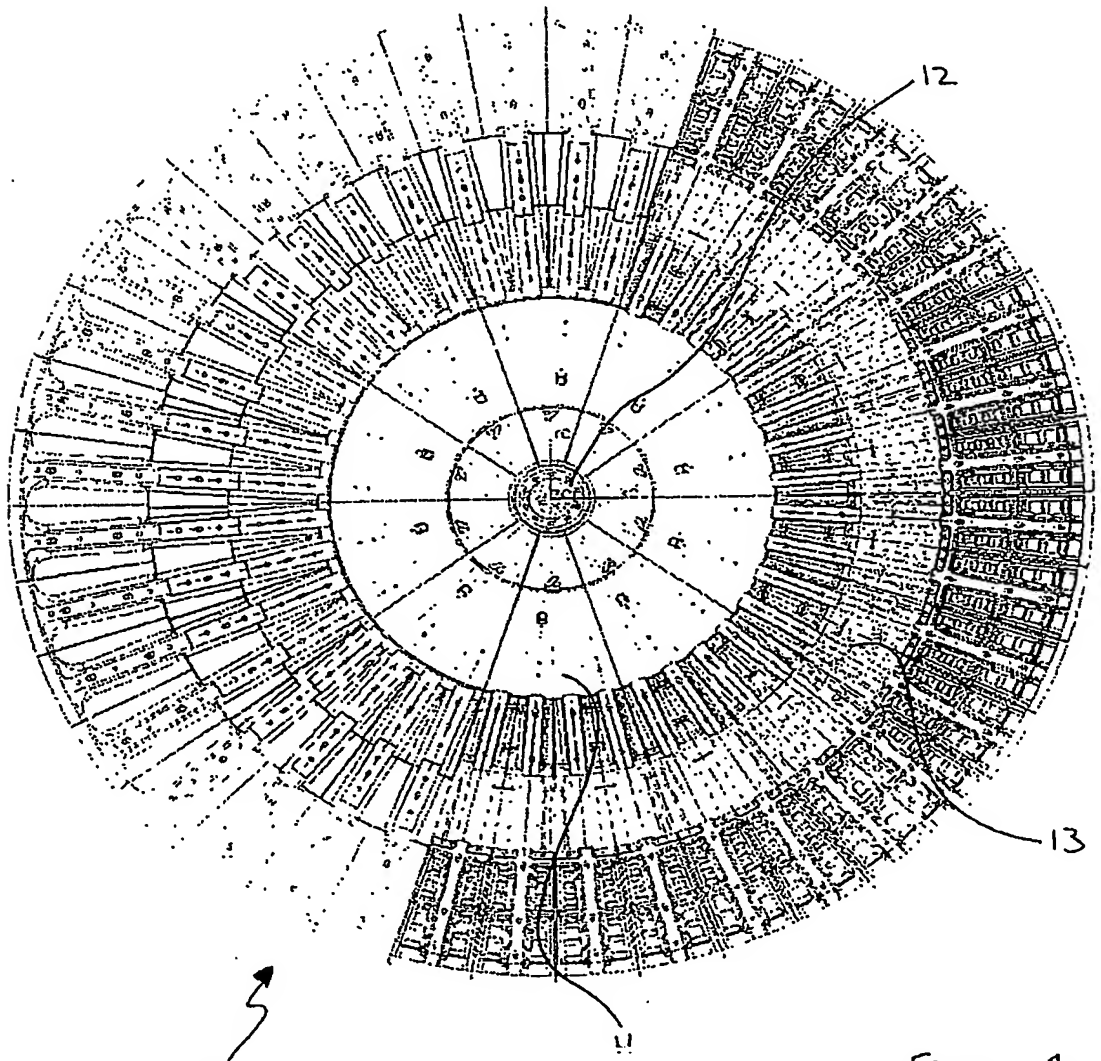

Figure 1

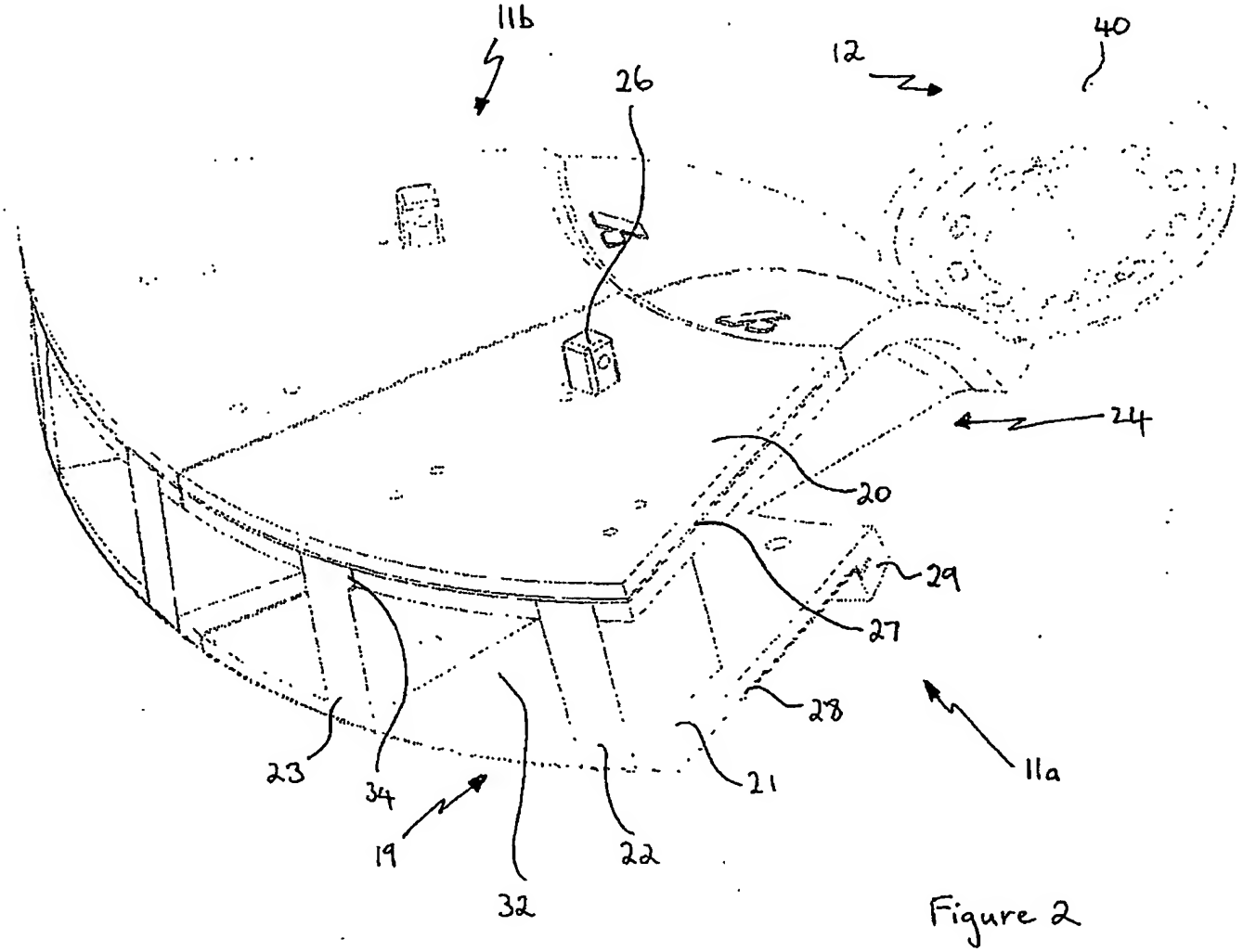

Figure 2

A

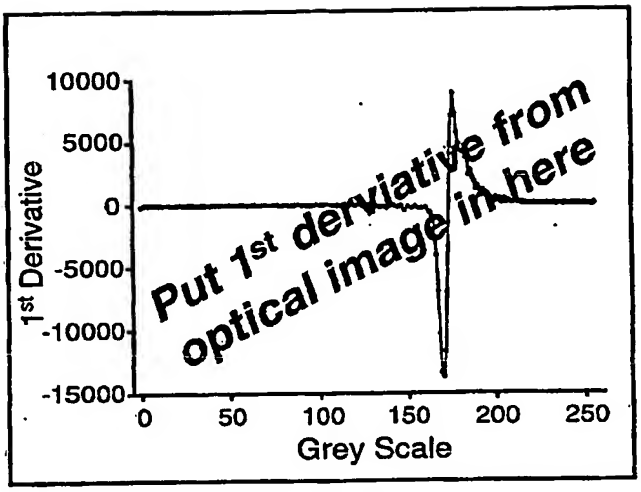

Fig 7A

B

Fig 7B

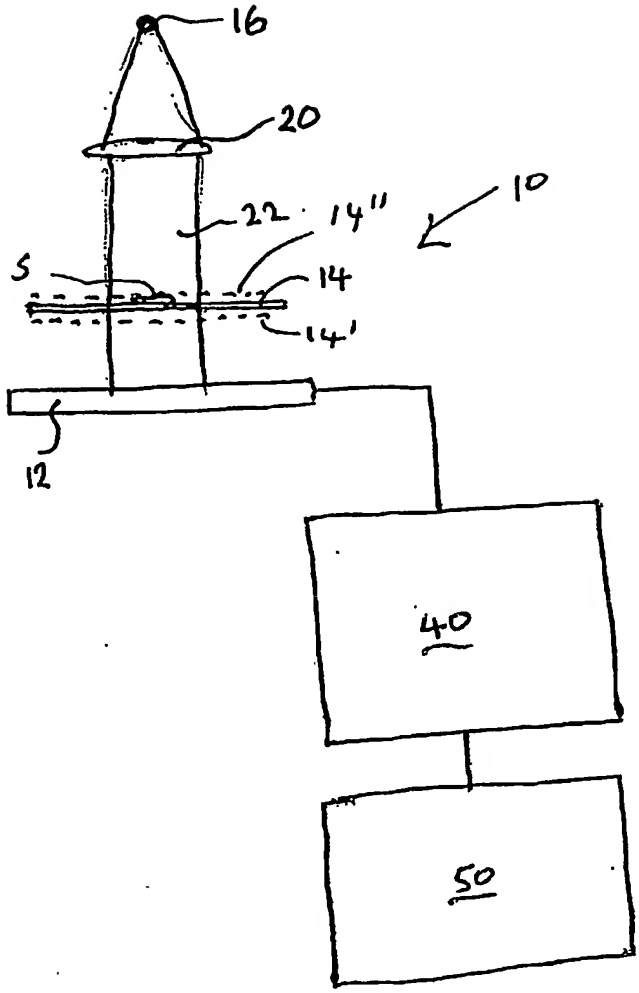

Fig 1

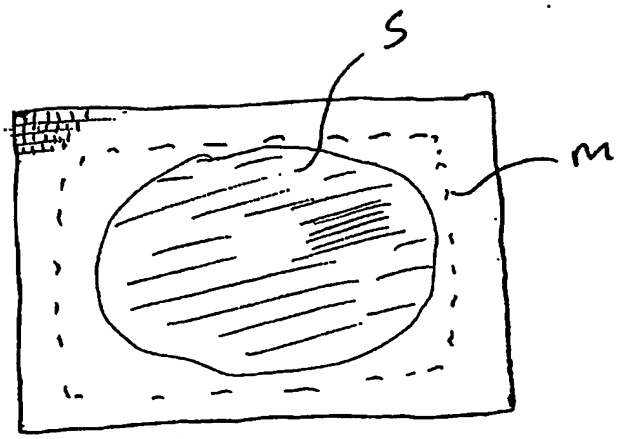

Fig 2

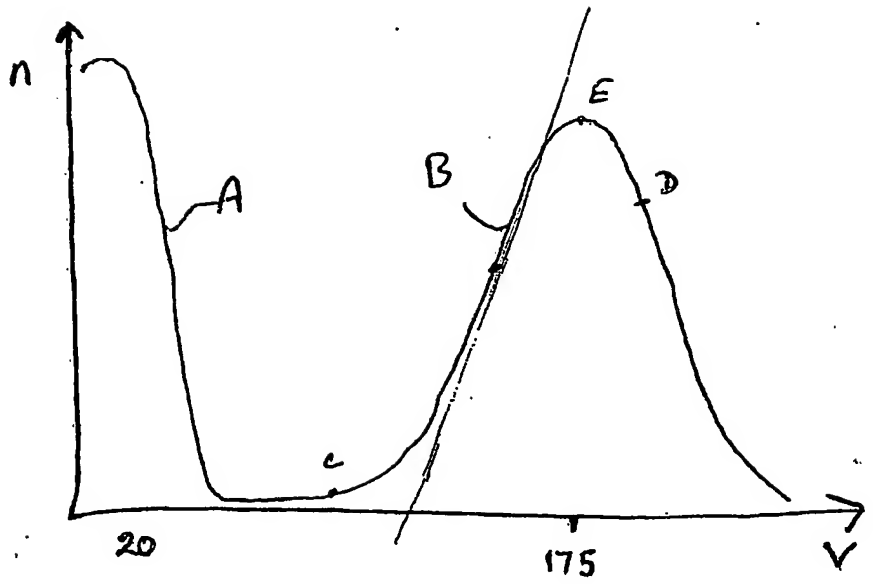

Fig 3

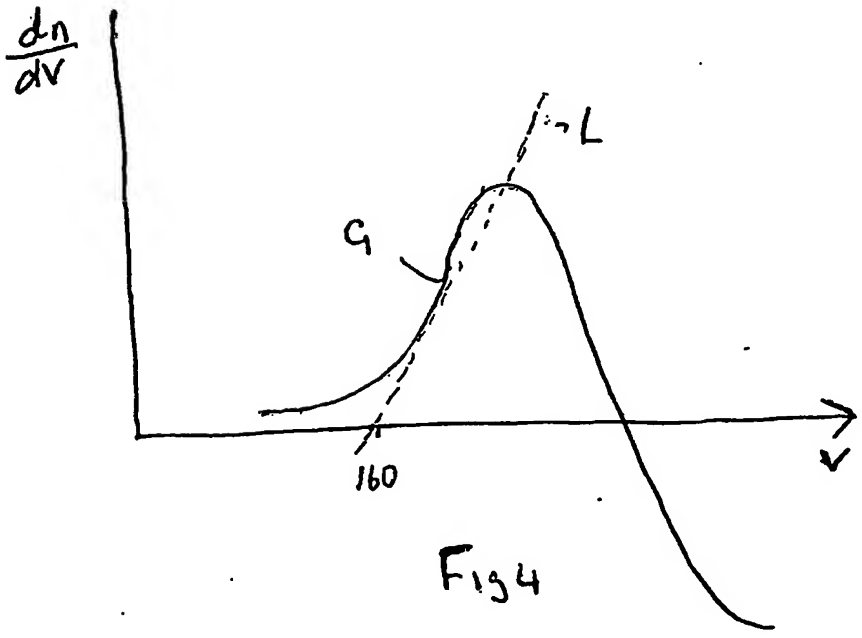

Fig 4

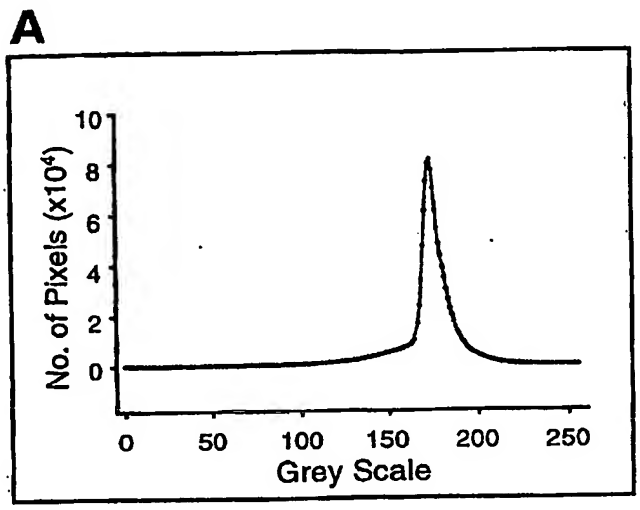

Fig 6A

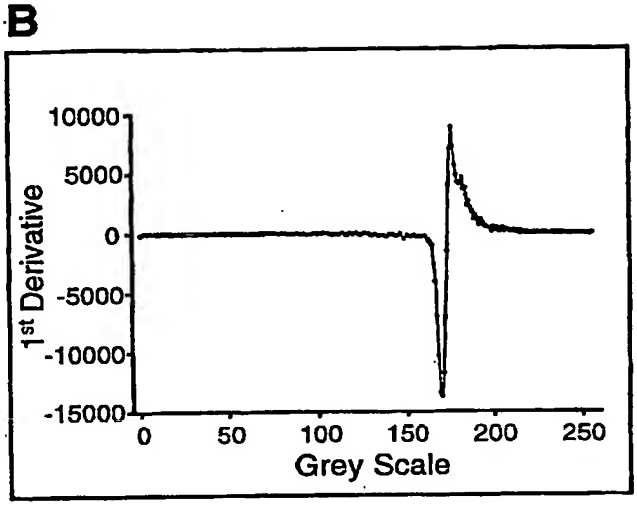

Fig 6B

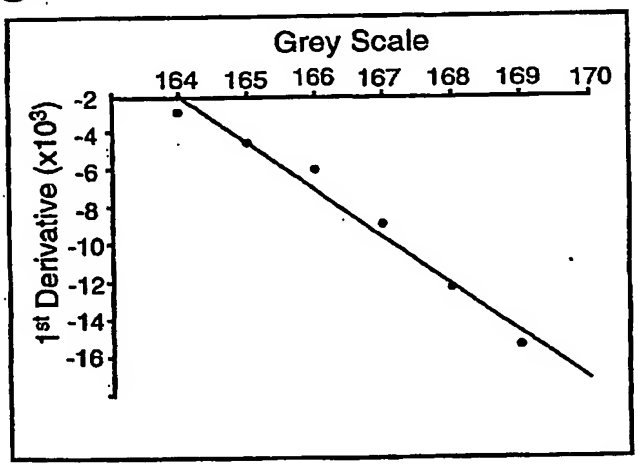

Fig 6C

Fig 6D